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U.S. Bureau of
Reclamation

Central valley project,
California

[Washington]

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CENTRAL VALLEY PROJECT CALIFORNIA

WATER FOR -
IRRIGATION
NAVIGATION
FLOOD CONTROL
POWER
CITIES AND TOWNS
INDUSTRIES
SALINITY CONTROL
FISH AND WILD LIFE
RECREATION



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION II

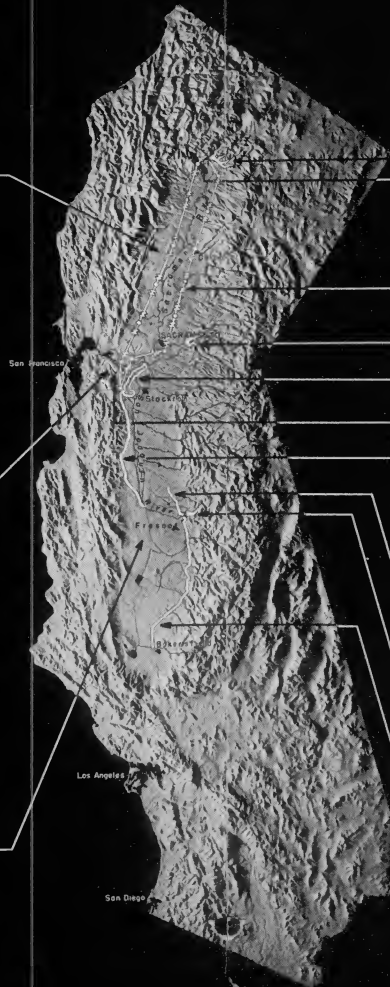
THE PROJECT TO-DAY

THE PROBLEM

SACRAMENTO VALLEY While two-thirds of the Central Valley's water supply originates in this section, the Sacramento Valley contains but one-third of the agricultural lands. Stream flows reach their crests in late winter and spring, allowing the greater percentage of valuable water resources to waste unused into the Pacific Ocean and occasionally causing destructive floods. In summer low river stages often are inadequate to meet irrigation needs, and prevent river navigation for any considerable distance upstream from Sacramento.

DELTA REGION This fertile farming area is threatened by the inflow of salt water from San Francisco Bay during the late summer months when fresh water in the Sacramento and San Joaquin Rivers reaches low stage and is insufficient to repel the incursion of salt tides. As a result, thousands of rich, irrigated acres face permanent damage and the cities and industries of the Delta and northern Bay areas suffer for lack of adequate fresh water supply.

SAN JOAQUIN VALLEY This section of the Central Valley contains two-thirds of the agricultural lands, but is provided by nature with only one-third of the water supply. During the summer when irrigation reaches its peak there is not enough water to meet crop needs. A large portion of these lands are irrigated by pumping and the overdraft on subsurface supplies resulting from expansion of agriculture has caused a serious water deficiency. Thousands of acres already have been abandoned because of the lack of water, and many additional thousands of acres are similarly threatened. Located in this section are many thousands of acres of dry land which can be made productive by an assured irrigation supply.



THE SOLUTION

SHASTA DAM — stores Sacramento River water for use downstream and for transfer into the San Joaquin Valley. It controls floods, aids river navigation and generates power.

KESWICK DAM — regulates the water released through Shasta Power Plant for use downstream. It also has a power plant and facilities for fish conservation.

TRANSMISSION LINES — convey power from Shasta and Keswick Plants for the operation of project pumping works and for sale to other agencies.

FOLSOM DAM — stores American River water for irrigation, power and flood control. Under construction by Corps of Engineers, U.S. Army, it is to be integrated into C.V.P. upon completion.

DELTA CROSS CHANNEL — carries Sacramento River water across the Delta to Tracy Pumping Plant and furnishes a fresh water supply to repel salt water intrusion.

CONTRA COSTA CANAL — brings irrigation to the farms of Contra Costa County and supplies fresh water to towns and industries.

DELTA-MENDOTA CANAL — carries water from Tracy pumps southward along west side of San Joaquin Valley to Mendota to replace San Joaquin River water diverted at Friant Dam.

MADERA CANAL — diverts water northwesterly from Friant Dam for irrigation of lands in Madera County.

FRIANT DAM — stores San Joaquin River water for diversion through the Madera and Friant-Kern Canals onto the thirsty lands of the San Joaquin Valley. It also provides flood control.

FRIANT-KERN CANAL — diverts water southward from Friant Dam for irrigation use in Fresno, Tulare and Kern Counties.

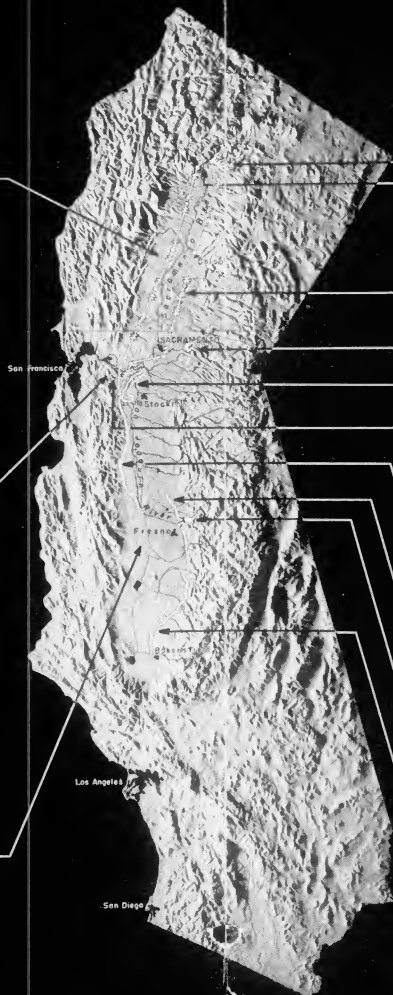
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THE DAMS AND RESERVOIRS

SHASTA DAM



KEY CVP STRUCTURE is giant Shasta Dam which spans the Sacramento River at the great valley's northernmost tip, 10 miles above Redding. The world's second highest dam, Shasta stores the winter flows of the Pit, McCloud, and Sacramento Rivers to serve the summer needs of the great valley below. The dam is 602 feet high, has a crest length of two-thirds of a mile, and contains 6 million cubic yards of concrete. Over its spillway, floodwater drops 480

feet, nearly three times the height of Niagara Falls. Shasta Reservoir is California's largest man-made lake, stores $4\frac{1}{2}$ million acre-feet of water, creates 365 miles of scenic shore line, and provides vacationists with 47 square miles of lake surface for boating, fishing, and swimming. Shasta's powerhouse is California's largest hydroelectric plant, operating five generators of 75,000 kilowatt capacity each, plus two local service units.

THE CENTRAL VALLEY of California is a land of great achievement. The magic of irrigation and drainage has turned a desolation of swamp and desert into an area of rich farms and attractive cities. The great valley, 500 miles long and 50 miles wide, covers 18 counties, includes 83 cities and towns, and supports 1,500,000 people. From its ranches, orchards, vineyards, and dairies pour an abundance of crops, both staple and specialty, worth each year about \$640,000,000.

The Central Valley is also a land of great promise. Its floor, foothills, and encircling mountains are richly endowed with resources—timber, oil, natural gas, gold and other minerals; fish, game, and parks of surpassing beauty; and, most

important of all, abundant water in mountain streams and snowbanks. The valley's fertile land, and the water that makes it live, are only half-developed; more than 3,000,000 additional acres of good land remain unirrigated.

The valley is watered by many streams that converge to form the Sacramento and San Joaquin Rivers. They drain their namesake valleys and join at the Delta to empty into San Francisco Bay. The initial features of the Central Valley project control and utilize these two rivers. But it is the waters of the smaller streams, now wasting to the sea, that will make this land of promise a valley of fulfillment.

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ASTRIDE THE San Joaquin River, 20 miles north-east of Fresno, is CVP's second major multiple-purpose structure—Friant Dam, the world's fourth largest. Chief function of this dam and its two outlets, Madera and Friant-Kern Canals, is to store and divert for beneficial use the floodwaters of the State's second largest river.

Sprawling out below Friant are two-thirds of the great valley's agricultural lands. Here in the San Joaquin Valley lie thousands of highly productive farms, orchards, vineyards, cotton fields, dairies, and stock ranches—as well as vast tracts of dry arable land not yet irrigated. Their owners, blessed as they are with rich soil, ample sunshine, and ready markets, live under the foreboding threat of water famine, many of them doomed to watch their underground water table sink lower each year and the desert creep back toward their homesteads like a blight. Some have drilled costly wells as deep as 2,000 feet. Thousands of irrigated acres have been abandoned; some 800,000 acres are threatened with a similar fate. One of CVP's first and most pressing missions is to rescue these farms with water from Friant's system.

Friant Dam, 320 feet in height, is 3,430 feet long on top. It has no powerplant because the canals take most of the water out at a high elevation on the dam in order that it will flow by gravity the 37 miles northward and the 150 miles south. The reservoir, Miller-ton Lake, has a capacity of 500,000 acre-feet of water, is 15 miles

FRIANT DAM



long, covers 5,900 acres, and has 43 miles of shore line spotted with picnic grounds. Its cool waters offer pleasant recreational activities during the hot valley summers. Since the war Miller-ton Lake has become one of the most popular fishing resorts in the State.

The irrigation water conserved at Friant Dam and distributed through the Madera and Friant-Kern Canals is sold at canal-side to irrigation districts and other water users' agencies in the San Joaquin Valley. Through the subsidy of CVP power revenues that help repay the cost of irrigation features, water can be furnished to farmers at a price they can reasonably afford to pay.

KESWICK DAM



NINE MILES downstream from Shasta is Keswick Dam, with a powerplant and fish conservation works. Keswick Reservoir provides afterbay regulation of water released from the Shasta powerplant. The Keswick powerplant contains three generators of 25,000-kilowatt capacity each. The hydroelectric power generated at Shasta and Keswick powerplants equals the power that would be produced by steam plants consuming $3\frac{1}{2}$ million barrels of oil a year.

The Keswick fish elevators trap the salmon and sea trout of the Sacramento River before they reach Shasta Dam. The fish are transported in special trucks to hatcheries and spawning grounds on streams tributary to the Sacramento below Keswick Dam.

INTENTIONAL SECOND EXPOSURE

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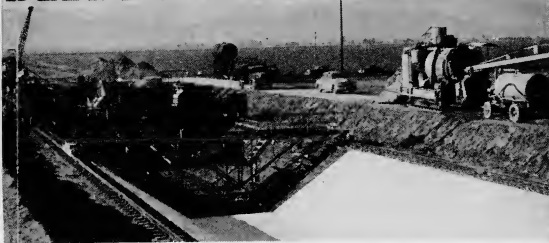
THE CANALS

FRIANT - KERN CANAL



LONGEST CVP WATERWAY is the Friant-Kern Canal, another "young river" that goes to the rescue of millions of eager acres in Fresno, Tulare, and Kern Counties with life-giving water from the San Joaquin River. A maximum of 5,000 cubic feet of water per second is borne from Friant Dam by gravity along the valley's east rim for a distance of 153 miles as far as the Kern River near Bakersfield. Irrigation districts along the route contract to buy water at canalside and distribute it to their member-farmers. Under reclamation law each farmer is entitled to enough CVP water to irrigate 160 acres or, if married, 320 acres of his land.

DELTA - MENDOTA CANAL



AFTER FLOWING southward through the Delta Cross Channel, surplus waters from the Sacramento River are picked up near Tracy, lifted 200 feet by electrically driven pumps, and poured into the Delta-Mendota Canal. This man-made river carries 4,600 second-feet of water south for 120 miles along the San Joaquin Valley's west side to Mendota Pool on the San Joaquin River. En route, this imported supply irrigates farms and replaces the San Joaquin River flow which is being turned into the Friant-Kern and Madera Canals at Friant Dam. The Tracy pumping plant will use Shasta power to boost Sacramento River water into the San Joaquin Valley.

MADERA CANAL



ALSO TAKING OFF from Friant Dam to wind in a generally northwestern direction is Friant's No. 2 carrier, the Madera Canal. Its function is to deliver 1,000 second-feet of water to about 150,000 acres of farmland in Madera County. Madera Canal carries its blessing of mountain water a distance of 37 miles through rolling foothill country as far as Ash Slough near the Merced County line. The canal began service of irrigation water in 1944 when half completed. It has been in operation for its entire length since the summer of 1945. The lands it serves produce grapes, cotton, figs, alfalfa, vegetables, and grains.

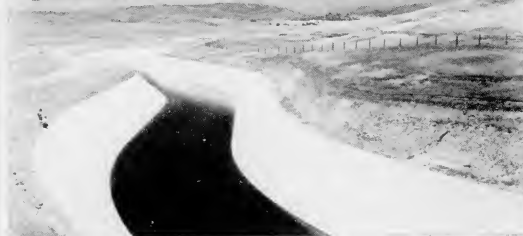
CONTRA COSTA CANAL



THE CONTRA COSTA CANAL, first CVP unit to go into operation, is an important factor in the agricultural and industrial development along the southern bank of the Sacramento River from Oakley westward to Martinez near the valley outlet into San Francisco Bay. Four pumping plants lift Sacramento-San Joaquin Delta water 124 feet at Rock Slough, whence the canal winds westward for 48 miles. With its extensions, it supplies water to 22,000 acres of land with a rich potential production of fruits and vegetables for the San Francisco Bay area. Industrial water is supplied to manufacturing plants along Suisun Bay, and domestic water to cities in the area.

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FRIANT - KERN CANAL



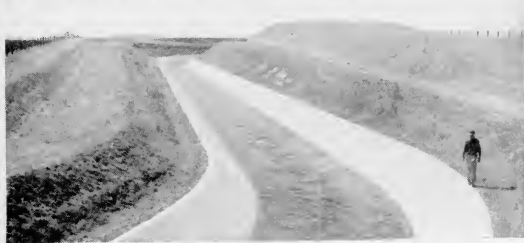
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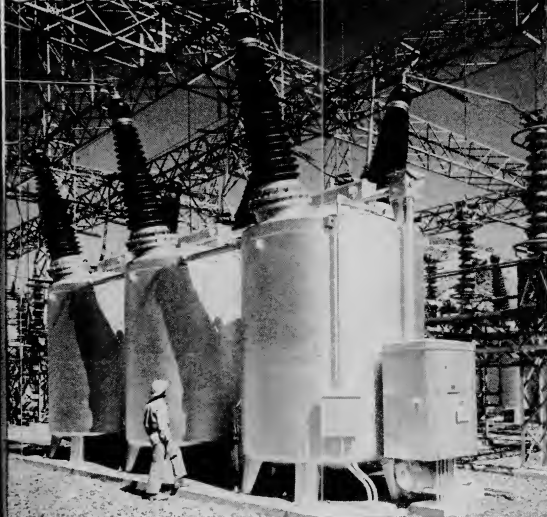


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POWER

THE PROJECT

SHASTA SWITCHYARD



WHILE CVP is primarily an irrigation project, another important function is development of falling water's byproduct—electric power. One-third of Shasta's power will be transmitted to the huge Tracy pumping plant to lift Sacramento River water into the Delta-Mendota Canal and to smaller CVP pumping plants on the Contra Costa and other canals. The rest will be sold to cities, irrigation districts, and other bodies.

Revenue from power sales will bear three-fourths of the repayable costs of CVP's initial features. This will enable irrigationists to buy CVP water at reasonable rates, and also make available a large block of low-cost power for city, industrial, and agricultural consumers. Without Shasta and Keswick power to help finance CVP's costly works the project could not have been built; without this financial help CVP water would be too expensive for the farmers to buy. Necessary to deliver this power supply when needed are transmission lines, switchyards, substations, and a steam stand-by plant.

Project power not only keeps down the cost of water to farmers, its availability also offers a compelling incentive to the establishment of new industries in the valley, and it is badly needed by farmers for their own pumps, milking machines, and other agricultural operations.



THE INITIAL CVP features now being completed will irrigate 500,000 acres of new land and furnish water for about 500,000 acres of cultivated lands in dire need of a supplemental supply. To provide for the valley's expanding water needs the Congress has directed the Bureau to prepare plans for future conservation works.

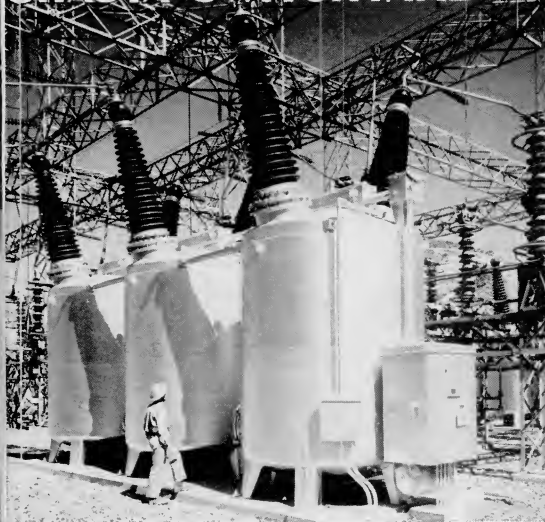
Accordingly, the Bureau, after years of study, has issued a Central Valley Basin report, presenting a sound basis for developing an immediate and long-range program of water-conservation works as an integrated part of the CVP. These works—24 dams and reservoirs in the foothills of the Sierra and Coast ranges, powerhouses, transmission lines, canals, distribution systems, and related works—would bring under irrigation about 1,000,000 additional acres, or 12,500 family-sized farms, keeping pace with the valley's population growth and adding about 1,000,000 kilowatts to the project's power potential.

Of the 24 reservoirs listed in the report, nine would have power-plants. The reservoirs also would provide domestic and industrial water to many growing communities.

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TOMORROW

THE BUREAU's ultimate program is designed to put to beneficial use *all* water resources of the Central Valley. This master plan contemplates 48 dams and 20 large canals, powerhouses and other works, and would double Central Valley's irrigated area. The total program—that now being built and the ultimate development—would provide water for 3,040,000 acres of land not now irrigated and produce 8 billion kilowatt-hours of power a year.

The completed basinwide development, largely self-liquidating, would double the number of prosperous farms in the great valley, add to its crop income about \$200,000,000 annually, assure supplies of domestic water, expand industry through the abundance of low-cost power, provide flood and salinity control, and open great vistas for recreation on the man-made lakes that will rim the valley.

Individual elements of this phase of development are being considered in connection with long range project-planning investigations. Thus, years hence when this program is completed, all the great valley's idle or destructive waters will have been tamed, harnessed, and put to work for the people.



**END OF
TITLE**